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MECHANICS.

159. Proposed by J. E. SANDEES, Hackney, Ohio.

Required the time for a tree, considered as a material line of uniform density, length $a=100$ feet, to fall; the tree being inclined $\phi=1'$ from perpendicular.

160. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, Ohio.

Given the paracentric acceleration c^2/r^4 and the angular velocity $(n/m)\pi$, to determine the equation of the orbit.

DIOPHANTINE ANALYSIS.

116. Proposed by HARRY S. VANDIVER, Bala, Pa.

If n is an odd positive integer, and $1, n, n', n'', \dots$, denote all its distinct integral divisors, then $2^n > 2(n+1)(n'+1)(n''+1)\dots$

117. Proposed by R. W. D. CHRISTIE.

Without the use of the method of continued fractions, solve the equation $x^2 - 149y^2 = 1$, and generalize your method. [From the *Educational Times*].

AVERAGE AND PROBABILITY.

145. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, O.

In each quadrant of a given circle, a circle is described at random. A point is taken at random in each of these circles. What is the average area of the quadrilateral formed by joining with straight lines these four points?

146. Proposed by L. C. WALKER, A. M., Graduate Student, Leland Stanford Jr. University, Cal.

A random straight line crosses a given ellipse; find the chance that two points, taken at random in the ellipse, shall lie on opposite sides of the line.

MISCELLANEOUS.

140. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, O.

Prof. Felix Klein asserts that

$$I_1 = \int \frac{dz}{\sqrt{[z(1-z)(1-kz)]}} = 2\text{sn}^{-1}(\sqrt{z})$$

is a *more* canonical form of the first Legendrian elliptic integral than

$$I_2 = \int_0^x \frac{dx}{\sqrt{[(1-x^2)(1-\kappa^2 x^2)]}} = \text{sn}^{-1}(x, \kappa).$$

Show this.